## Absolute Maximum Ratings (Voltage relative to GND, @$T_A$ = +25°C, unless otherwise specified.)

| Characteristic | Symbol | Value | Unit |
|---|---|---|---|
| Input Voltage | $V_{IN}$ | -0.3 to 100 | V |
| Continuous Input & Output Current | $I_{IN}$, $I_{OUT}$ | 400 | mA |
| Peak Pulsed Input & Output Current | $I_{IM}$, $I_{OM}$ | 2 | A |
| Maximum Voltage applied to $V_{OUT}$ | $V_{OUT(MAX)}$ | Smaller of $V_{IN}$+8.2V or 14.5V | V |

## Maximum Current at $V_{IN}$ = 48V (@$T_A$ = +25°C, unless otherwise specified.)

| Characteristic | | Symbol | Value | Unit |
|---|---|---|---|---|
| Continuous Output Current | (Note 7) | $I_{OUT}$ | 42 | mA |
| Pulsed Output Current | (Note 8) | $I_{OM}$ | 800 | mA |
| | (Note 9) | | 160 | |

## Thermal Characteristics

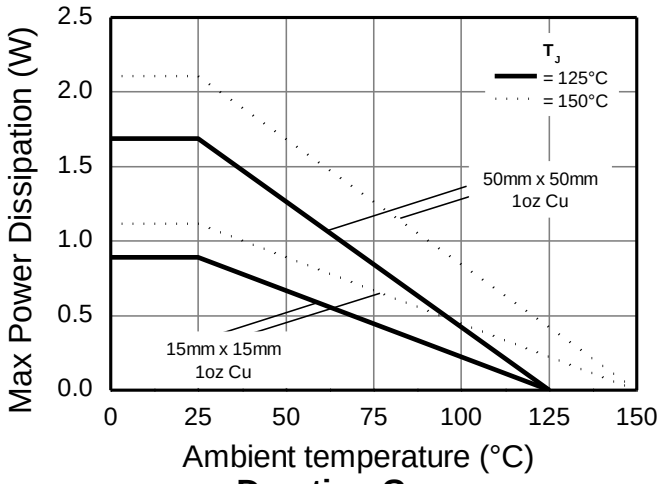
| Characteristic | | Symbol | Value | Unit |
|---|---|---|---|---|
| Power Dissipation | (Note 5) | $P_D$ | 1.7 | W |
| | (Note 6) | | 0.89 | |
| Thermal Resistance, Junction to Ambient | (Note 5) | $R_{\theta JA}$ | 59 | °C/W |
| | (Note 6) | | 112 | |
| Thermal Resistance, Junction to Lead | (Note 10) | $R_{\theta JL}$ | 20 | |
| Thermal Resistance, Junction to Case | (Note 10) | $R_{\theta JC}$ | 15.7 | |
| Recommended Operating Junction Temperature Range | | $T_J$ | -40 to +125 | °C |
| Maximum Operating Junction and Storage Temperature Range | | $T_J$ , $T_{STG}$ | -65 to +150 | °C |

## ESD Ratings (Note 11)

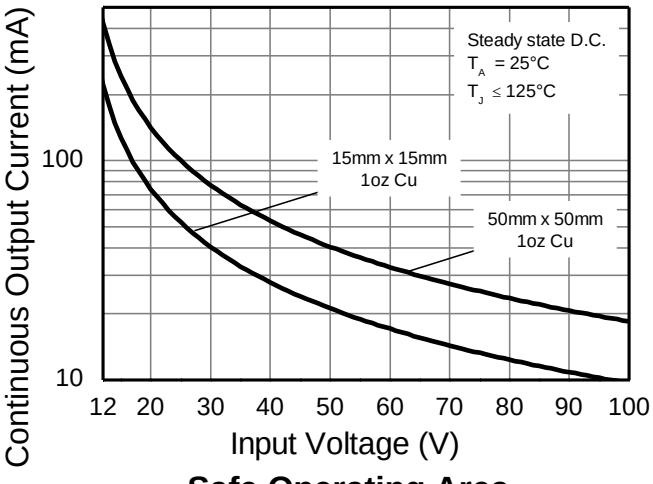
| Characteristics | Symbols | Value | Unit | JEDEC Class |
|---|---|---|---|---|
| Electrostatic Discharge – Human Body Model | ESD HBM | 4,000 | V | 3A |
| Electrostatic Discharge – Machine Model | ESD MM | 400 | V | C |

Notes:
5. For a device mounted with the exposed $V_{IN}$ pad on 50mm x 50mm 1oz copper that is on a single-sided 1.6mm FR4 PCB; device is measured under still air conditions whilst operating in steady-state.
6. Same as Note 5, except mounted on 15mm x 15mm 1oz copper.
7. Same as Note 5, whilst operating at $V_{IN}$ = 48V. Refer to Safe Operating Area for other Input Voltages.
8. Same as Note 5, except measured with a single pulse width = 100µs and $V_{IN}$ = 48V.
9. Same as Note 5, except measured with a single pulse width = 10ms and $V_{IN}$ = 48V.
10. $R_{\theta JL}$ = Thermal resistance from junction to solder-point (on the exposed $V_{IN}$ pad). $R_{\theta JC}$ = Thermal resistance from junction to the top of case.
11. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

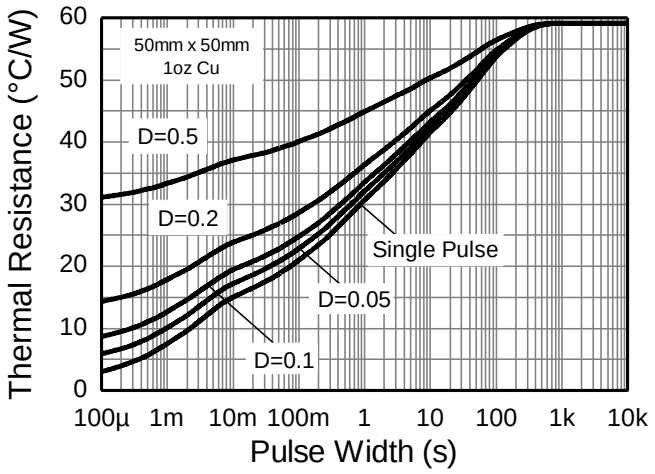
## Thermal Characteristics and Derating Information



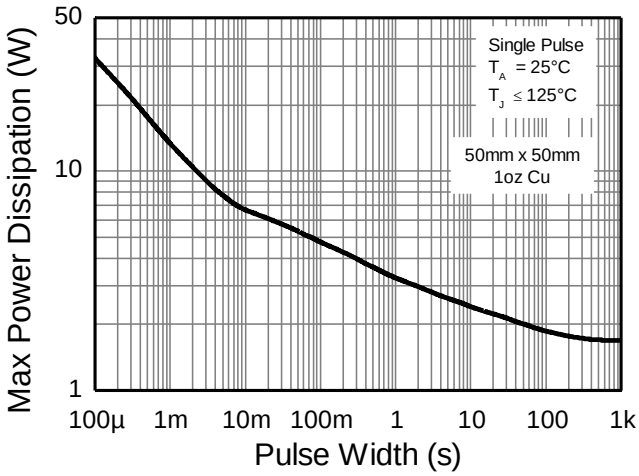

**Derating Curve**



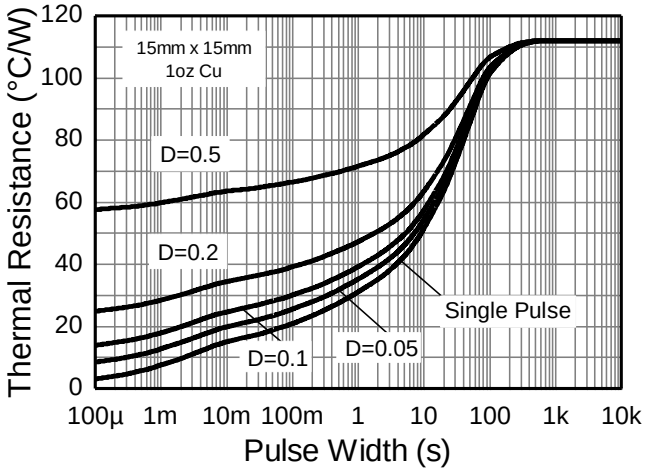

**Safe Operating Area**



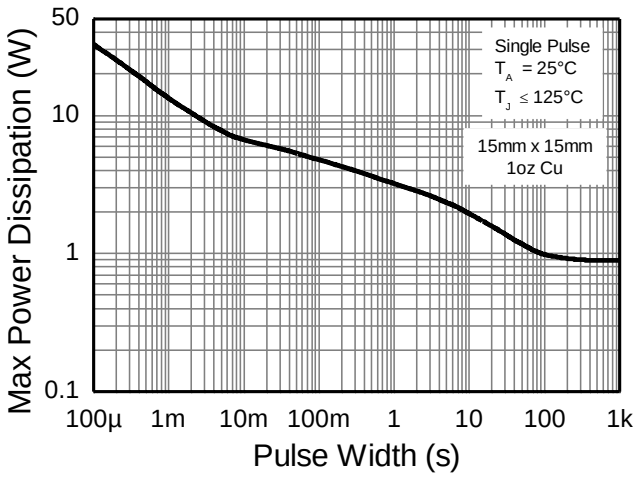

**Transient Thermal Impedance**




**Pulse Power Dissipation**




**Transient Thermal Impedance**



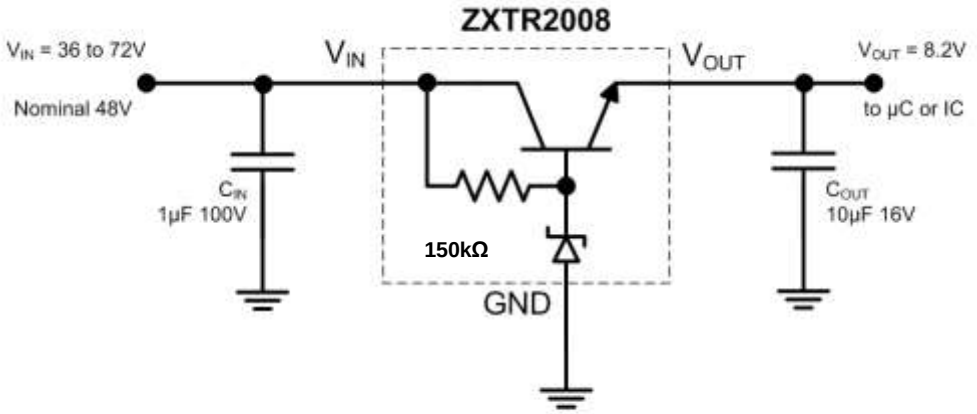

**Pulse Power Dissipation**

## Electrical Characteristics (@$T_A$ = +25°C, unless otherwise specified.)

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|---|---|---|---|---|---|---|
| Output Voltage (Note 12) | $V_{OUT}$ | 7.38 | 8.2 | 9.02 | V | $V_{IN}$ = 48V, $I_{OUT}$ = 15mA |
| Line Regulation (Notes 12 & 13) | $\Delta V_{OUT}$ | — | 10 | 300 | mV | $V_{IN}$ = 12 to 100V, $I_{OUT}$ = 15mA |
| Temperature Coefficient | $\Delta V_{OUT}/\Delta T$ | — | 10 | — | mV/°C | $T_J$ = -40°C to +125°C<br>$V_{IN}$ = 48V, $I_{OUT}$ = 15mA |
| Load Regulation (Notes 12 & 14) | $\Delta V_{OUT}$ | — | -180<br>-250 | -350<br>-500 | mV | $I_{OUT}$ = 0.1 to 30mA, $V_{IN}$ = 48V<br>$I_{OUT}$ = 0.1 to 100mA, $V_{IN}$ = 48V |
| Minimum Value of Input Voltage Required to Maintain Line Regulation | $V_{IN(MIN)}$ | 12 | — | — | V | — |
| Quiescent Current | $I_Q$ | — | 275<br>650 | 500<br>900 | µA | $V_{IN}$ = 48V, $I_{OUT}$ = 10µA<br>$V_{IN}$ = 100V, $I_{OUT}$ = 10µA |
| Power Supply Rejection Ratio | $\Delta V_{IN}/\Delta V_{OUT}$ | — | 38 | — | dB | $C_{OUT}$ = 100nF, $I_{OUT}$ = 15mA,<br>$V_{OUT}$ = 8.2V, $V_{IN}$ =12 to 100V,f=100Hz |

Notes: 12. Measured under pulsed conditions. Pulse width ≤ 300µs. Duty cycle ≤ 2%
13. Line regulation $\Delta V_{OUT} = V_{OUT}(@\ V_{IN} = 100V) – V_{OUT}(@\ V_{IN} = 12V)$
14. Load regulation $\Delta V_{OUT} = V_{OUT}(@\ I_{OUT} = 30mA) – V_{OUT}(@\ I_{OUT} = 0.1mA)$
$\Delta V_{OUT} = V_{OUT}(@\ I_{OUT} = 100mA) – V_{OUT}(@\ I_{OUT} = 0.1mA)$

## Typical Application Circuit

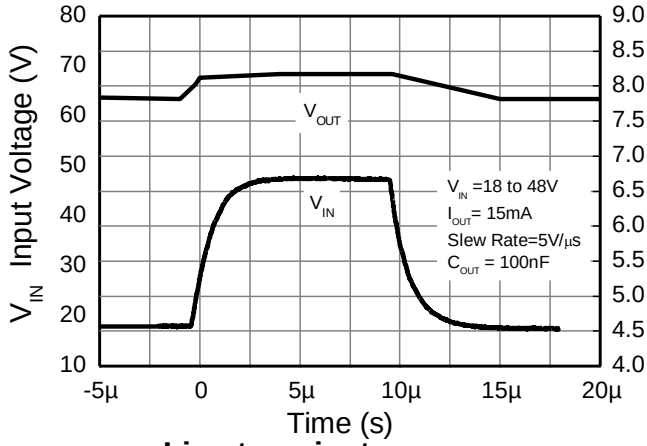



Example of an 8.2V regulated supply from a nominal 48V for powering a Controller IC.

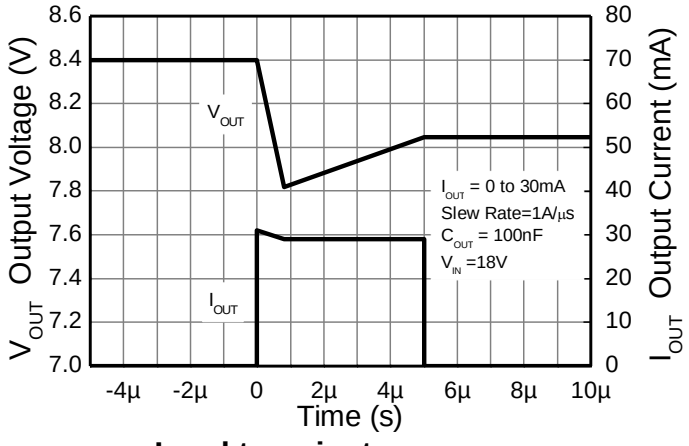
## Pin Functions

| Pin Name | Pin Function | Notes |
|---|---|---|
| **$V_{IN}$** | Input Supply | Input voltage can vary from -0.3V to 100V with respect to GND; for $V_{OUT}$ regulated then 12V ≤ $V_{IN}$ ≤ 100V. It is recommended to connect a 1µF capacitor to GND. |
| **GND** | Power Ground | This pin should be tied to the system ground. |
| **$V_{OUT}$** | Voltage Output | Outputs a regulated 8V when 12V ≤ $V_{IN}$ ≤ 100V. When $V_{IN}$ < 12V, then $V_{OUT}$ maximum = $V_{IN}$ – 1.5V.<br>The pin can be pulled high to a maximum of +14V with respect to GND, or +8V with respect to $V_{IN}$, whichever is lower. It is recommended to connect a 10µF capacitor to GND and a minimum of 10µA to be drawn from $V_{OUT}$ to maintain regulation. |

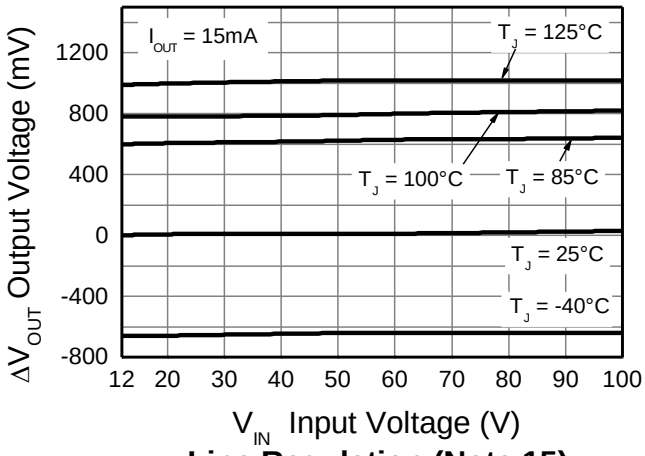
## Typical Electrical Characteristics (@$T_A$ = +25°C, unless otherwise specified.)



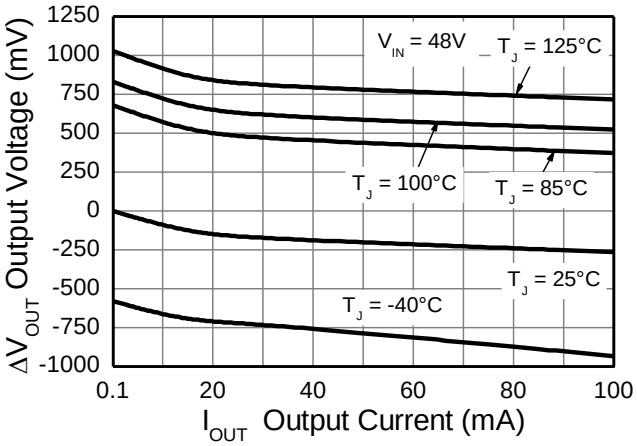

**Line transient response**



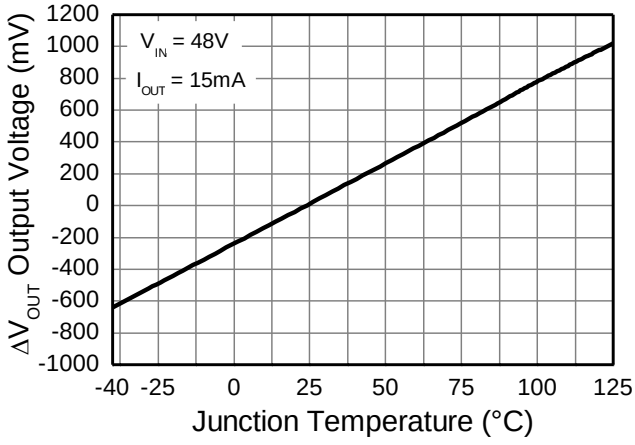

**Load transient response**



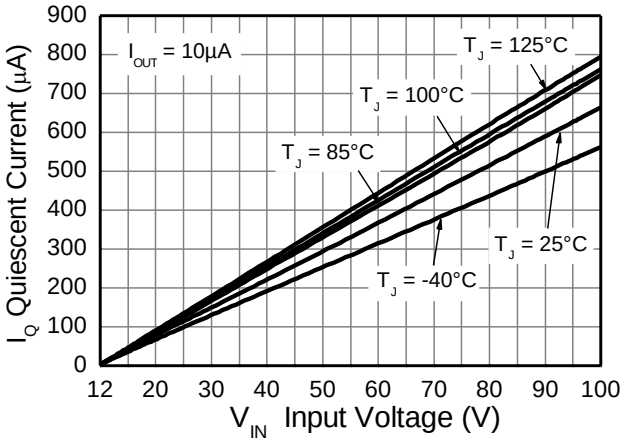

**Line Regulation (Note 15)**




**Load Regulation (Note 16)**




**Temperature Coefficient (Note 17)**



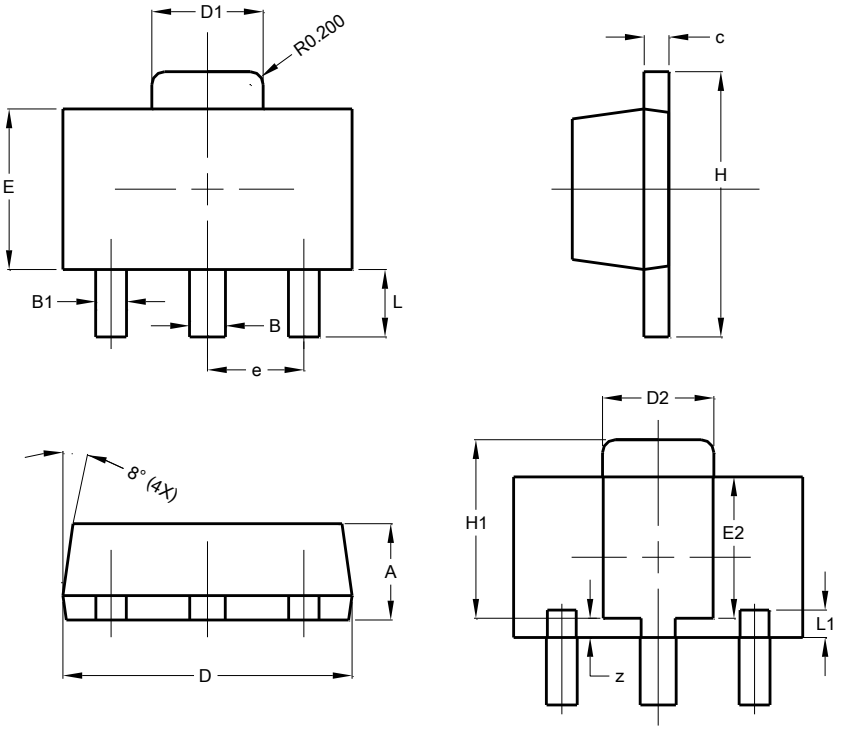

**Quiescent Current**

Notes: 15. Line regulation $\Delta V_{OUT} = V_{OUT} – V_{OUT}$ (@ $V_{IN}$ = 12V, $I_{OUT}$ = 15mA, $T_J$ = +25°C)
16. Load regulation $\Delta V_{OUT} = V_{OUT} – V_{OUT}$ (@ $V_{IN}$ = 48V, $I_{OUT}$ = 0.1mA, $T_J$ = +25°C)
17. Temperature Coefficient $\Delta V_{OUT} = V_{OUT} – V_{OUT}$ (@ $V_{IN}$ = 48V, $I_{OUT}$ = 15mA, $T_J$ = +25°C)

## Package Outline Dimensions

Please see http://www.diodes.com/package-outlines.html for the latest version.

**SOT89**

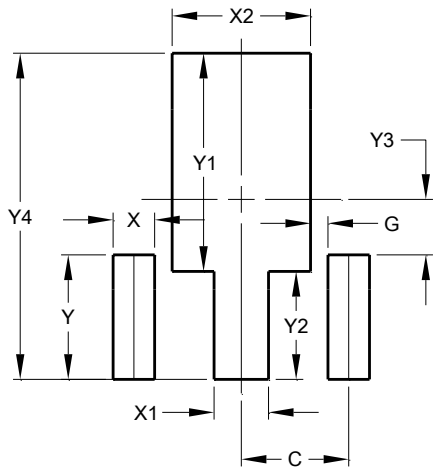



| SOT89 | | | |
|---|---|---|---|
| **Dim** | **Min** | **Max** | **Typ** |
| **A** | 1.40 | 1.60 | 1.50 |
| **B** | 0.50 | 0.62 | 0.56 |
| **B1** | 0.42 | 0.54 | 0.48 |
| **c** | 0.35 | 0.43 | 0.38 |
| **D** | 4.40 | 4.60 | 4.50 |
| **D1** | 1.62 | 1.83 | 1.733 |
| **D2** | 1.61 | 1.81 | 1.71 |
| **E** | 2.40 | 2.60 | 2.50 |
| **E2** | 2.05 | 2.35 | 2.20 |
| **e** | - | - | 1.50 |
| **H** | 3.95 | 4.25 | 4.10 |
| **H1** | 2.63 | 2.93 | 2.78 |
| **L** | 0.90 | 1.20 | 1.05 |
| **L1** | 0.327 | 0.527 | 0.427 |
| **z** | 0.20 | 0.40 | 0.30 |
| **All Dimensions in mm** | | | |

## Suggested Pad Layout

Please see http://www.diodes.com/package-outlines.html for the latest version.

**SOT89**




| Dimensions | Value (in mm) |
|---|---|
| **C** | 1.500 |
| **G** | 0.244 |
| **X** | 0.580 |
| **X1** | 0.760 |
| **X2** | 1.933 |
| **Y** | 1.730 |
| **Y1** | 3.030 |
| **Y2** | 1.500 |
| **Y3** | 0.770 |
| **Y4** | 4.530 |

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